

REMARKS

Applicants' attorney acknowledges with appreciation the telephone interview held with Examiner Lee on October 6, 2005, the brief interview of October 26, 2005 to clarify the Advisory Action, and the telephone call from the Examiner on November 1, 2005 requesting correction of some formalities in the claims. In accordance with those interviews, and in response to the Office Action outstanding in this application, applicants have added a clarifying amendment to the specification, have cancelled claims 10, 11 and 40, and have rewritten claims 16-19, 21, 22, 25, 26, 28, 30-32, 35 and 39. Claims 16-18, 25-34 and 36-39 were allowed, and claims 19, 21, 22 and 35 were objected to in the Office Action, and it is believed that the foregoing amendments meet all of the objections raised in that Action as well as the formal matters raised in the telephone call. Reconsideration of the application in light of these changes and in view of the following comments is respectfully solicited.

This invention is directed to multilevel three-dimensional structures, which may include photonic crystals, optical couplers or the like, of arbitrary shape fabricated in layers on the surface of a substrate, with each layer being a lithographically definable material and with adjacent layers preferably being separated by photosensitive barrier layers or films. The shapes of the layers are lithographically defined and exposed individually as the layers are formed. After all layers have been deposited on the substrate, all are developed in a single step to produce the final solid structure. This final structure has a shape corresponding to the shapes of the stacked layers, with each layer producing a corresponding level of the final structure.

The structure of the invention may be defined and formed on a substrate integrally with semiconductor devices also on the substrate to produce a monolithic

device such as an optical coupler for interconnecting the semiconductor devices on the substrate with each other or with external optical devices. The lithographically defined layers may be a polymer or a positive or negative photoresist material so that, for example, the monolithic device of the invention may be formed from the exposed portions of the layers of a negative photosensitive material or from the unexposed portions of a positive photosensitive material to produce a three-dimensional optical structure having multiple vertically aligned levels, each of arbitrary shape, and at any desired location on the substrate.

In the Office Action, allowable claim 35 was objected to for failure to use the term "consisting of." This claim has been amended in accordance with the suggested language, and is now believed to be in condition for allowance.

Claim 19 was objected to in the Office Action for incorporating "new matter" in the recitation of barrier layers of photosensitive material. As discussed during the interview, the material set forth in the example at page 20 of the specification; namely, CEM365IS, is inherently photosensitive. Accordingly, it is respectfully submitted that the specification clearly supports the language of the claims, and that the recitation of a photosensitive barrier layer is not new matter. To clarify this matter, the specification has been amended to specify that the described material is in fact photosensitive. Claim 19 is, therefore, believed to be clearly allowable.

Claims 21 and 22 are now dependent on allowed claim 25, and are believed to be clearly allowable.

Allowed claim 25 has been amended for clarification, now specifying that "each" of the multiple layers is of a selected arbitrary shape. This was the intended meaning of the claim as allowed, but this amendment is believed to make the meaning clearer.

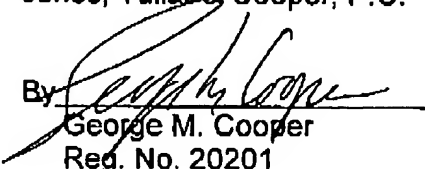
In response to the formalities raised by the examiner, the preambles of claims 16-19, 21 and 22 have been revised to correspond to that of parent claim 25. In addition, dependent claims have been amended to clarify the references to "patterns," since lithographically-defined patterns are described in the independent claims for a first layer and for multiple independent layers. In each case the dependent claims were referring to all of the patterns, but this has now been clarified by referring to the patterns in the "first and additional" layers. Applicants appreciate the Examiner's concerns, and trust that the claims are now clear and unambiguous.

CONCLUSION

In view of the foregoing amendments and remarks, the present application is now believed to be in condition for allowance, and favorable reconsideration is requested.

Should the Examiner have any questions, he is requested to contact the undersigned.

Respectfully submitted,
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